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| 10/551,864 | 11/26/2007 | John E. Lockley | APLE 200002US01 | 2047 |
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| FAY SHARPE LLP 1228 Euclid Avenue, 5th Floor The Halle Building Cleveland, OH 44115 | | | EXAMINER HU, HENRY S | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/551,864 | Applicant(s) LOCKLEY ET AL. | |
| | Examiner HENRY S. HU | Art Unit 1796 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Election of July 21, 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 17-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to **Election** filed on July 21, 2010, which is in response to Restriction requirement filed on March 31, 2010. **Applicants have elected Group I, Claims 1-16 without traverse.** As telephone interview of July 28, 2010, Group I is related to **a four-step process of making a formulation** comprising an ion-conducting polymeric material. It is **not a device for analyzing a material.**

2. This Application **10/551,864** is a **371/PCT/GB2004/001375** with a UK priority at April 2, 2003. **Two Pre-Amendments** and **one IDS** (1 page) are filed so far. Claims 3-6, 8-16 and 19 are amended to only remove the improper multiple claim dependency, while no claim is cancelled or added. **A brief description for drawing is added** on page 1 in specification, Examiner thereby **accepts** Applicants' **one** drawing sheet with Figure 1. **Claims 1-20 with two independent claims** (Claims 1 and 17) are now pending, while non-elected Claims 17-18 (Group II) and Claims 19-20 (Group III) are withdrawn from consideration. An action follows. Only "A"-cited references are found in international search report for Applicants' priority paper **WO 2004/088673 A1 to Lockley et al. for PCT/GB2004/001375.**

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

On **Claim 1** at line 3, the writing as “**a type which includes: (i) ...; (ii) ...; and (iii) ...**” cause indefiniteness since “**only one type** moiety from (i), (ii) or (iii)” may be used. However, Examiner understands that the chemical structure of such a type of polymeric material would actually comprise all the three different moieties as disclosed in (i), (ii) and (iii) in the same polymeric material. Accordingly, **rewriting with clarification is required**.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. The limitation of “not-yet-amended” parent **Claim 1** in present invention relates to a method of preparing a formulation comprising an ion-conducting polymeric material, the method comprising:

(a) *selecting an ion-conducting polymeric material of a type which includes: (i) phenyl moieties; (ii) carbonyl and/or sulphone moieties; and (iii) ether and/or thioether moieties;*

(b) *selecting a solvent mixture comprising water and a first organic solvent in which mixture said ion-conducting polymeric material can be dissolved and/or dispersed;*

(c) *dissolving and/or dispersing said ion-conducting polymeric material in said solvent mixture;*

(d) *removing greater than 80% of the total amount of said first organic solvent in said solvent mixture, thereby to leave a formulation comprising said ion-conducting polymeric material dissolved and/or dispersed in a solvent formulation comprising a major amount of water.*

*See other limitations of dependent **Claims 2-16**.*

6. **Claims 1-16 are rejected** under 35 U.S.C. 102(e) as being anticipated by **McCovick et al.** (US 2004/0110867 A1 with a US filing date at December 6, 2002).

Regarding “**process of making a formulation**” of “not-yet-amended” parent **Claim 1**, said process “**comprises**” **four** sequential steps including: (A) **selecting an ion-conducting polymeric material**; (b) **selecting a solvent mixture** comprising water and a first organic solvent; (c) dissolving and/or dispersing said ion-conducting polymeric material; (d) removing

“greater than 80%” of the total amount of said first organic solvent. Regarding polymeric material (component A), **“only one type moiety from (i), (ii) or (iii)”** may be used. However, Examiner understands that the chemical structure of such a type of polymeric material would **actually comprise all three different moieties as disclosed in (i), (ii) and (iii)** within the same polymeric material. Open language **“comprising”** is applied to the process of parent Claim 1.

7. **McCovick** et al. have already prepared some **aqueous pigmented ink formulations**, which in some “composite” cases they indeed comprise the ion-conducting polymer (ionomer) comprising the claimed **three** type moieties. To be specific, see the addition of water-soluble, water reducible or water dispersible polymer such as **polyester type ionomers** in the course of making polymer/pigment composite colorant particles (paragraphs 0035-0037 and 0042-0048); particularly see the three moieties including (i), (ii) and (iii) are indeed all containing in the same ionomers as disclosed in paragraphs 0046-0048.

8. The preparation of ink formulation as disclosed in paragraph 0030 fundamentally includes **three** steps as: (A) **dissolving a dye in a water-miscible solvent** to form a solution, (B) then **dispersing said solution as fine liquid droplets into an aqueous solution**, and (C) finally **removing the solvent** by evaporation. In summary, a solvent mixture comprising water and at least some organic solvent(s) are used to dissolve/disperse the ionomer (paragraph 0070). The later removal of organic solvent(s) would form the claimed ink formulation. By doing so, **an ink jet ink composition comprising 30-90 wt% of water is obtained** (abstract, line 1-7).

Accordingly, McCovick anticipates the process limitation of parent Claim 1.

9. Regarding the solvent conditions in **Claims 2-8 and 10**, see the disclosures throughout paragraphs 0030 and 0070.

Regarding the amounts of ion-conducting polymer for **Claims 9 and 11**, see paragraph 0058, line 1-3; abstract, line 1-7.

Regarding the chemical structure conditions in **Claims 12-16**, see paragraphs 0046-0048. The sulfonation on aromatic rings in **Claim 13** is seen on paragraph 0046 at structures #1 and 3.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. **Claims 1-16 are rejected** under 35 U.S.C. **103(a)** as obvious over **Cardew et al. (EP 202,849 A2)**, **Hana et al. (EP 145,305 B1)** and **Tomaschka et al. (EP 277,834 B1)**, in combination or alone in view of **McCovick et al. (US 2004/0110867 A1)**.

Regarding “**process of making a formulation**” of “not-yet-amended” parent **Claim 1**, said process “**comprises**” **four** sequential steps including: (A) **selecting an ion-conducting polymeric material**; (b) **selecting a solvent mixture** comprising **water and a first organic solvent**; (c) **dissolving and/or dispersing** said ion-conducting polymeric material; (d) **removing greater than 80% of the total amount of said first organic solvent**. With respect to the polymeric material (component A), “**only one type** moiety from (i), (ii) or (iii)” may be used. However, Examiner understands that the chemical structure of such a type of polymeric material would **actually** **comprise all the three different moieties as disclosed in (i), (ii) and (iii)** within the same polymeric material. Open language “**comprising**” is applied to the process of parent Claim 1.

12. **Three** references including **Cardew, Hana and Tomaschka** in combination or alone have already prepared some “casting” compositions in the form as dispersion comprising ionomer(s) and a solvent mixture comprising water and at least some organic solvent(s) so as to be useful for making membranes. The ionomer can be a sulfonated polymer such as sulfonated polysulfones (see Cardew at page 8, line 4-10).

To be specific, see **Cardew** at abstract; page 9, line 10-28; see **Hana** at page 6, line 34-58; page 7, line 34-46; see **Tomaschka** at page 2, line 56-58; page 3, line 25-36.

13. Therefore, **Cardew, Hana and Tomaschka** in combination or alone is thereby silent about removing “greater than 80%” of the total amount of said first organic solvent.

McCovick alone can teach such a subject matter. **McCovick** et al. have already prepared some aqueous pigmented ink formulations, which in some “composite” cases indeed comprise the ion-conducting polymer (ionomer) comprising the claimed three type moieties. The process of preparation fundamentally includes three steps as: (A) **dissolving a dye in a water-miscible solvent** to form a solution, (B) then **dispersing said solution as fine liquid droplets into an aqueous solution**, and (C) finally removing the solvent by evaporation. By doing so, an aqueous pigmented ink formulation is effectively obtained and it is readily useful for future application or transportation. See paragraphs 0035-0037, 0042-0048 and 0070.

14. In light of the fact that all involving references are dealing with making of some compositions in the form as dispersion comprising ionomer(s) and a solvent mixture comprising water and at least some organic solvent(s), one having ordinary skill in the art would therefore have found it obvious to further modify **Cardew, Hana and Tomaschka**’s compositions by removing some organic solvent(s) as taught by **McCovick**. By doing so, an aqueous formulation is effectively obtained and it is readily useful for future application or transportation. Additionally, better and more diversified products may be thereby obtained.

15. Dependent **Claims 2-16** is thereby rejected with the disclosures by a combination of all four references along with the references cited therein.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a four-step method of preparing a formulation comprising an ion-conducting polymeric material as specified:

US 6,525,115 B2 to Wang et al. only discloses that some epoxy-functional particles can be dispersed in a solvent mixture comprising water and at least some organic solvent(s) so as to be in the form as dispersion. See title; column 2, line 38-57. The ionomer is not used. Additionally, Wang is silent about removing **“greater than 80%” of the total amount of said first organic solvent**. Therefore, Wang fails to teach or fairly suggest the process limitation of parent Claim 1.

17. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu whose telephone number is (571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Vasu Jagannathan, can be reached on (571) 272-1119. The **fax** number for the

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organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Peter D. Mulcahy/
Primary Examiner, Art Unit 1796

/Henry S. Hu/
Examiner, Art Unit 1796

August 14, 2010